**Case Report**

**An uncommon case of TTC in a young woman with multiple sclerosis**

**Basal Tako-Tsubo cardiomyopathy**


*Cardiovascular Medicine Department, Ospedale Regionale di Bellinzona e Valli, Bellinzona, Switzerland; †Department of Neurology, Neurocenter of Southern Switzerland, Ospedale Regionale, Lugano, Switzerland; ‡Department of Cardiology, Fondazione Cardiocentro Ticino, Lugano, Switzerland; ©University of Zürich, Switzerland

**Summary**

Tako-Tsubo cardiomyopathy (TTC) is an infrequent, mostly stress-related transient cardiomyopathy, which mainly affects postmenopausal women. Inverted or basal TTC (B-TTC) episodes are rarer. Our case illustrates a rare example of B-TTC in a 30-year-old woman with an acute multiple sclerosis relapse as the associated stressor, possibly providing a hypothetical pathological substrate for this TTC episode. This uncommon case suggests that both factors of young age or neurological events may affect TTC pattern during one episode. Moreover, this case raises the question as to whether researchers on TTC should adopt a new perspective, embracing cardiovascular as well as neuro-anatomical and -functional features.

**Key words:** Tako-Tsubo cardiomyopathy; apical-sparing; multiple sclerosis; young age

**Case report**

The current report describes a 30-year-old Caucasian woman who came to our attention because she presented with a rapidly progressing bilateral proprioceptive ataxia, spinothalamic hypoaesthesia and gait impairment. Two years before, the patient had experienced an analogous neurological episode. Medical history, clinical, laboratory and imaging findings supported the diagnosis of an acute multiple sclerosis relapse according to McDonald criteria. Intravenous, and later oral, steroid therapy was implemented with suboptimal patient relief. Ten days later the patient was transferred to the coronary care unit because of acute typical chest pain. With the exception of ongoing suboptimal patient relief. Ten days later the patient was transferred to the coronary care unit because of acute typical chest pain. With the exception of ongoing significant neurological impairment no further clinical findings nor haemodynamic compromise were present. The electrocardiogram (ECG) showed diffuse ST-segment depression (fig. 1A), the corrected QT-interval was not prolonged (409 msec) and brain natriuretic peptide (BNP) levels were not measured. Transthoracic echocardiography showed akinetic basal segments (fig. 1B: 4-chamber view, end-systole: arrows) and apical hypercontractility with slightly reduced (45–50%) left ventricle ejection fraction (LVEF%) (see online Video 1: four-chamber view). These findings were inconsistent with a moderate increase in serum troponin (peak 3.5; reference value <0.09). The patient immediately underwent selective coronary angiography, which disclosed the absence of any coronary stenosis or dissection (fig. IC–D). Although cardiac magnetic resonance imaging (MRI) was not performed, the diagnosis of myocarditis was reasonably rejected owing to the absence of systemic inflammation (normal C-reactive protein, leukocyte and procalcitonin values), negative bacterial blood cultures and viral tests. Phaeochromocytoma was excluded because of normal 24-hour urine fractionated catecholamines and metanephrines. Two days later the ECG showed complete spontaneous normalisation (fig. 2). Thus, the diagnosis of basal (inverted) Tako-Tsubo cardiomyopathy (TTC) was retained.

Cerebrospinal MRI performed 5 days before the TTC episode showed an acute inflammatory lesion affecting dorsal medulla (fig. 1E). This area is involved in cardiovascular homeostasis and regulation of autonomic responses to stressful events through sympathetic drive [1], thus providing a hypothetical pathological substrate for this TTC episode. This medullary lesion recovered at 5-month MRI follow-up.

**Discussion**

Tako-Tsubo cardiomyopathy (TTC) is an infrequent, mostly stress-related transient cardiomyopathy, which is currently poorly understood and simulates acute coronary syndrome in the absence of significant obstructive lesions on coronary angiography [2]. TTC mainly affects the midapical segments of the left ventricle in postmenopausal women and apical-sparing TTC episodes are rare [2]. Relying on a few case reports and a small observational trial, some investigators have raised the question of whether inverted or basal TTC (B-TTC) may be associated with young (premenopausal) age [3–6], neurological events that act as psychophysical stressors, and/or acute and sub-acute neurological events acting as psychophysical stressors [7].

Our case illustrates a rare example of B-TTC in a 30-year-old woman with an acute relapse of multiple sclerosis acting as an associated stressor. Approximately 90% of reported TTC cases occur in postmenopausal women of advanced age and are mostly related to emotional or physical stress [2, 8]. There is evidence that a pathophysiological association between neuro-
logical disorders and TTC may exist [7]. Diagnostic criteria have been published excluding TTC in the case of acute cerebrovascular events and critically ill patients [2, 8, 9].

Previously described cases have suggested that AS-TTC is associated with either young age or neurological events. This uncommon case suggests that both conditions may affect TTC pattern during the same episode and that it should be considered for the patient’s correct management. It has actually been shown that different TTC patterns may be associated with different complications and short-term mortality [10]. Furthermore, only acute cerebrovascular events are currently considered exclusion criteria. This case raises the question of whether TTC episodes related to all sorts of acute neurological events should be classified as TTC in future diagnostic criteria and whether TTC diagnostic criteria should be revised. Lastly, it suggests that future research on TTC should be based on a new perspective, embracing cardiovascular as well as neuroanatomical and -functional features.

Video on www.cardiovascmed.ch:
Transthoracic echocardiography (4-chamber view) end-systole: it displays left ventricle (LV) wall motion abnormalities with akinetic basal segments, apical hypercontractility and moderately reduced LV ejection fraction.
Authors’ contribution
All authors take responsibility for all aspects of the reliability and freedom from bias of the data presented and their discussed interpretation.

Disclosure statement
No financial support and no other potential conflict of interest relevant to this article were reported.

References

Correspondence:
Mattia Cattaneo, MD
Clinical and Research fellow
Cardiovascular Medicine
Department – Ospedale Regionale di Bellinzona e Valli, San Giovanni (EOC), Via Soleggio
CH-6500 Bellinzona
Switzerland
mattia.cattaneo@eoc.ch

Figure 2: Post-acute phase ECG demonstrates complete normalisation of repolarisation within two days.